

# Digital Ham Radio

Low Power, No Problem

KARC 10/14/17 KH6CP

Craig Paul

# My HF Setup

- Yaesu FT-857d (max power 100w)
- WMR Rigblaster Advantage
- Windows Computer
- Comet CHA-250Bx vertical antenna (3.5-56 MHz – no tuner, no radials)

# Station Setup

- Computer -> Rigblaster -> Xceiver -> Antenna
- Barefoot
- No radials
- 40 watts or less

# Monitoring Xmit Performance

- PSKReporter

<https://pskreporter.info/pskmap.html>

- Hamspots

<http://hamspots.net/>

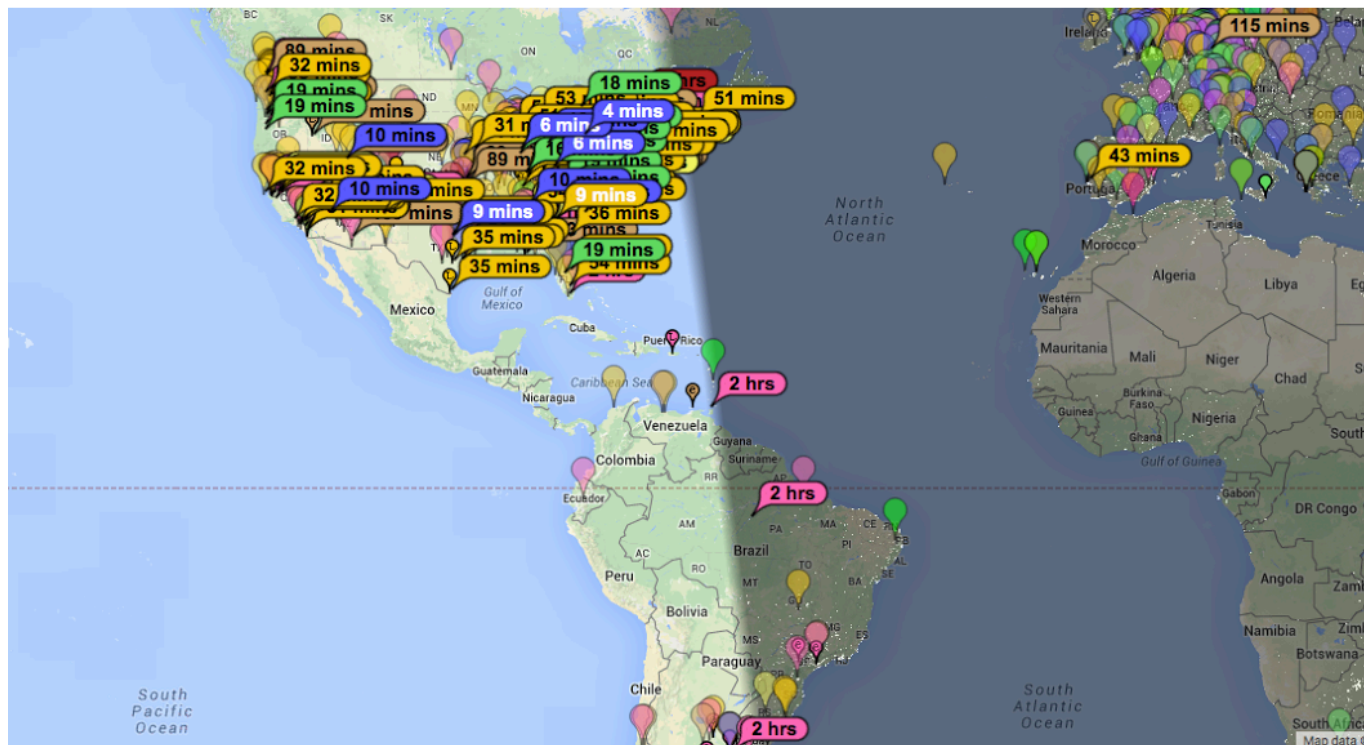
# PSKReporter



Craig Paul Moderator ▶ [Ham Radio Digital Modes](#)

Oct 10,  
2014

Nearly 31 mm (1.21 inches) of rain does wonders for our soil conductivity! Got QSOs on 7 bands, this afternoon, via a barefoot vertical with no radials. JT modes.



# Hamspots



Craig Paul Moderator ▸ [Ham Radio Digital Modes](#)

Oct 9, 2014

I guess nobody was monitoring WSQ2!  
I'm open for a sked for any of these modes!

S	Age	DX	Freq	Mode	St	Country	Spotter
P	5m	<a href="#">CO2DC</a>	14067.00	SIM31		Cuba	W4IWK
P	11m	<a href="#">WB4RQD</a>	14067.00	SIM31	FL	United States	W4IWK
P	26m	<a href="#">K0QUS</a>	14073.69	THOR	KS	United States	WA7IJV
P	35m	<a href="#">WB4RQD</a>	14067.00	SIM31	FL	United States	W4IWK
H	36m	<a href="#">KK5ID</a>	28123.35	OLIVIA	TX	United States	WD9DUI
P	50m	<a href="#">N9LYA</a>	14000.99	PACKET	IN	United States	WB8JAY
P	52m	<a href="#">EA8CZI</a>	14103.00	ROS		Canary Is.	DK8VE
P	53m	<a href="#">EA8CZI</a>	14103.00	ROS		Canary Is.	2E1GLT
P	53m	<a href="#">K0QUS</a>	14072.08	OLIVIA	KS	United States	KO6SY
P	+1h	<a href="#">G7CNF</a>	14067.00	SIM31		England	KG6VQH
P	+1h	<a href="#">G7CNF</a>	14067.00	SIM31		England	KG6VQH
P	+1h	<a href="#">G7CNF</a>	14067.00	SIM31		England	W4IWK
P	+1h	<a href="#">EA8CZI</a>	14103.00	ROS		Canary Is.	2E1GLT
P	+1h	<a href="#">K0QUS</a>	14103.00	ROS	KS	United States	EA8CZI
P	+1h	<a href="#">G7CNF</a>	14067.00	SIM31		England	KG6VQH
P	+1h	<a href="#">K0QUS</a>	14067.00	SIM31	KS	United States	W4IWK

# Free Software

- FLDIGI

<https://sourceforge.net/projects/fldigi/files/>

- Multipsk

[http://f6cte.free.fr/index\\_anglais.htm](http://f6cte.free.fr/index_anglais.htm)

- WSJT-X

<https://physics.princeton.edu/pulsar/k1jt/wshtx.html>

# FLDIGI

- Common digital ham modes  
RTTY, PSK31 (quick QSOs)
- Low SNR chat modes  
MFSK, Olivia/Contestia, DominoEx, IFKP
- EMCOMM  
MT63, Olivia, Multicarrier
- Nets  
FSQ



# Multipsk

- Slower PSK modes  
PSK10
- Modes found in Ham Radio Deluxe  
RTTM
- <http://ak3q.com/wp-content/uploads/2015/08/MultiPsk.pdf>

# Multipsk

- Some receive only modes require 30 euro purchase (Paypal)

Called “Professional Modes” – ACARS, DGPS, VDL2, SITOR A, Amtor ARQ, RTTY 100, SYNOP, APRS digipeating not limited to 10 minutes, more...

# Weak Signal

- WSJT-X

<https://physics.princeton.edu/pulsar/k1jt/wsجتx.html>

- WSPR

<https://physics.princeton.edu/pulsar/k1jt/wspr.html>

# Weak Signal

- Requires time sync within 2 seconds
- WWV/H manual setting
- Multipsk “CLOCK” program
- NTP Windows sync

Choose NIST server, Windows server not accurate enough

# Weak Signal

- WSJT-X

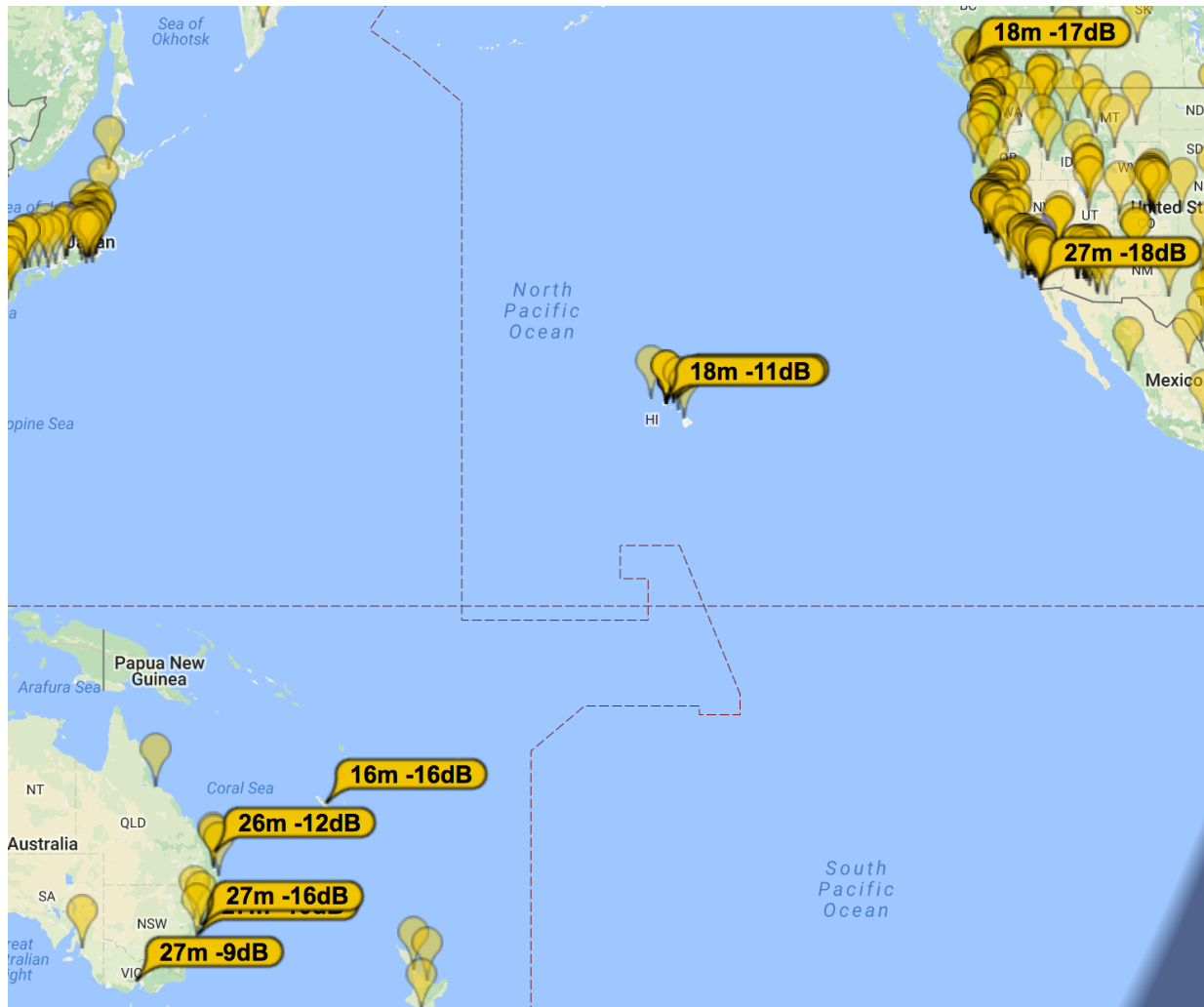
JT65 EME, Meteor scatter, sporadic E,  
HF (1 minute sequences)

JT9 HF (narrower bandwidth, 1 minute seq)

FT8 (new – 15 second sequences, same as JT65  
but not for EME)

FT8 still in beta, but has taken over 6 meters

# FT8 RC1 from BL11ck



# WSPR

- 2 minute sequences S/N to -30 db for HF
- 15 minute sequences (new) S/N to -37db for 630 and 2200 meters
- See the spots on [wsprnet.org](http://wsprnet.org)

# Nets

- HF – Montana, Minnesota, Arkansas and Hawaii use MT63
- HF, VHF – NW Missouri is using FSQ

FSQ is available in FLDIGI, but original is Windows only

<http://www.qsl.net/zl1bpu/MFSK/FSQweb.htm>



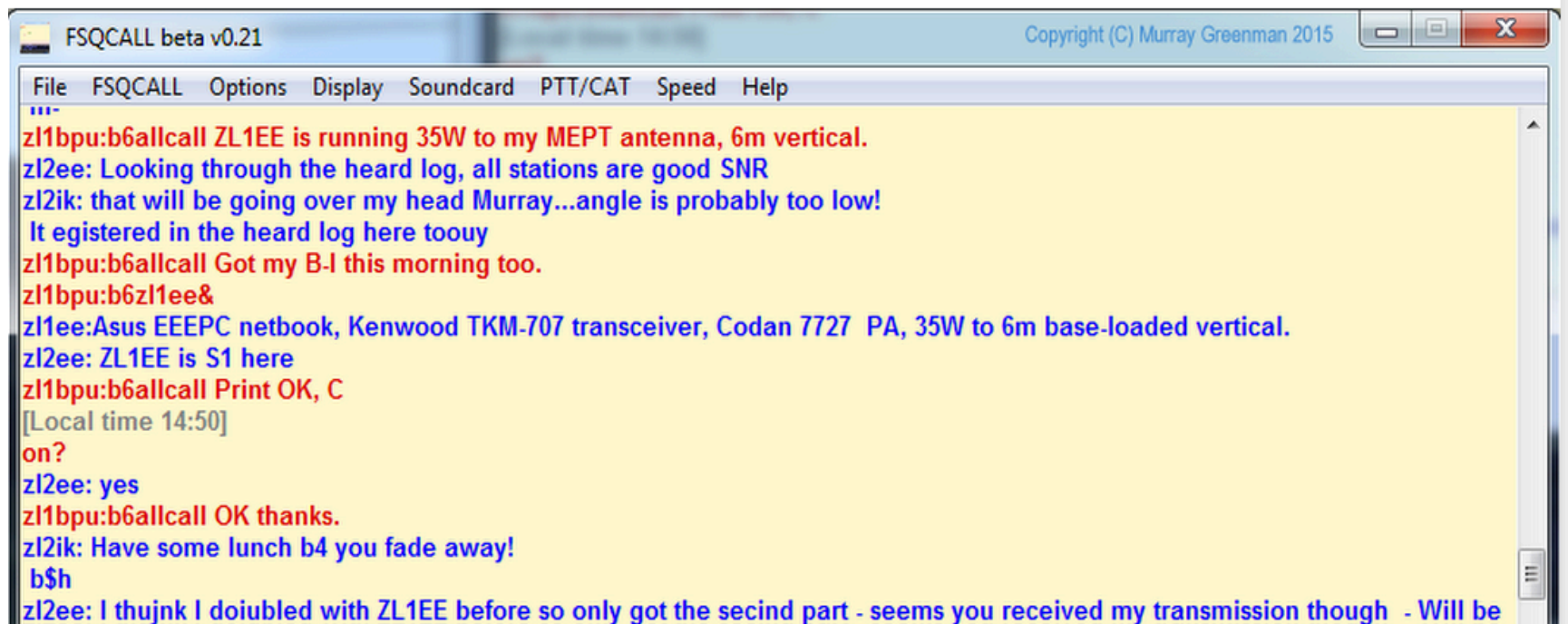
# FSQ

- Author suggests using 1150 Hz offset for traffic, and 1500 Hz for net control
- Directed calls (SELCAL)
- Relaying

# FSQCall

I've had some QSOs but logging isn't included with the software.

ZL2AFP FSQCALL



# FSQCall Download

<http://www.qsl.net/zl1bpu/MFSK/FSQweb.htm>

# OpenSource digital voice

- FreeDV

<https://freedv.org/>

- Intelligible beyond analog limits
- Narrower bandwidth than voice SSB
- High PAPR (12db) means 20W with 100W rig
- More sigs in FM and HF voice pass bands

# WinLink

- File and email transfer program

<https://www.winlink.org/WinlinkExpress>

- Used for EMCOMM also
- Includes WINMOR virtual TNC for standalone
- New free modem under development - ARDOP

# APRS

- Foundation doc by author Bob Bruninga

<http://www.aprs.org/APRS-docs/APRS.TXT>

144.39 MHz simplex in North America

10.1476 MHz USB

- Integrated mapping
- One to many protocol
- Digipeating means network is dynamic

# APRS

- Automatic Packet Reporting System

<http://www.aprs.org/>

- Weather
- Traveller info
- Repeater info
- Direction finding

# APRS

- Traffic reporting
- Winlink and Echolink pointers
- EOCs
- Emergency response

Kansas City area hospitals use it to advertise number and type of doctors on duty and the number and types of beds available

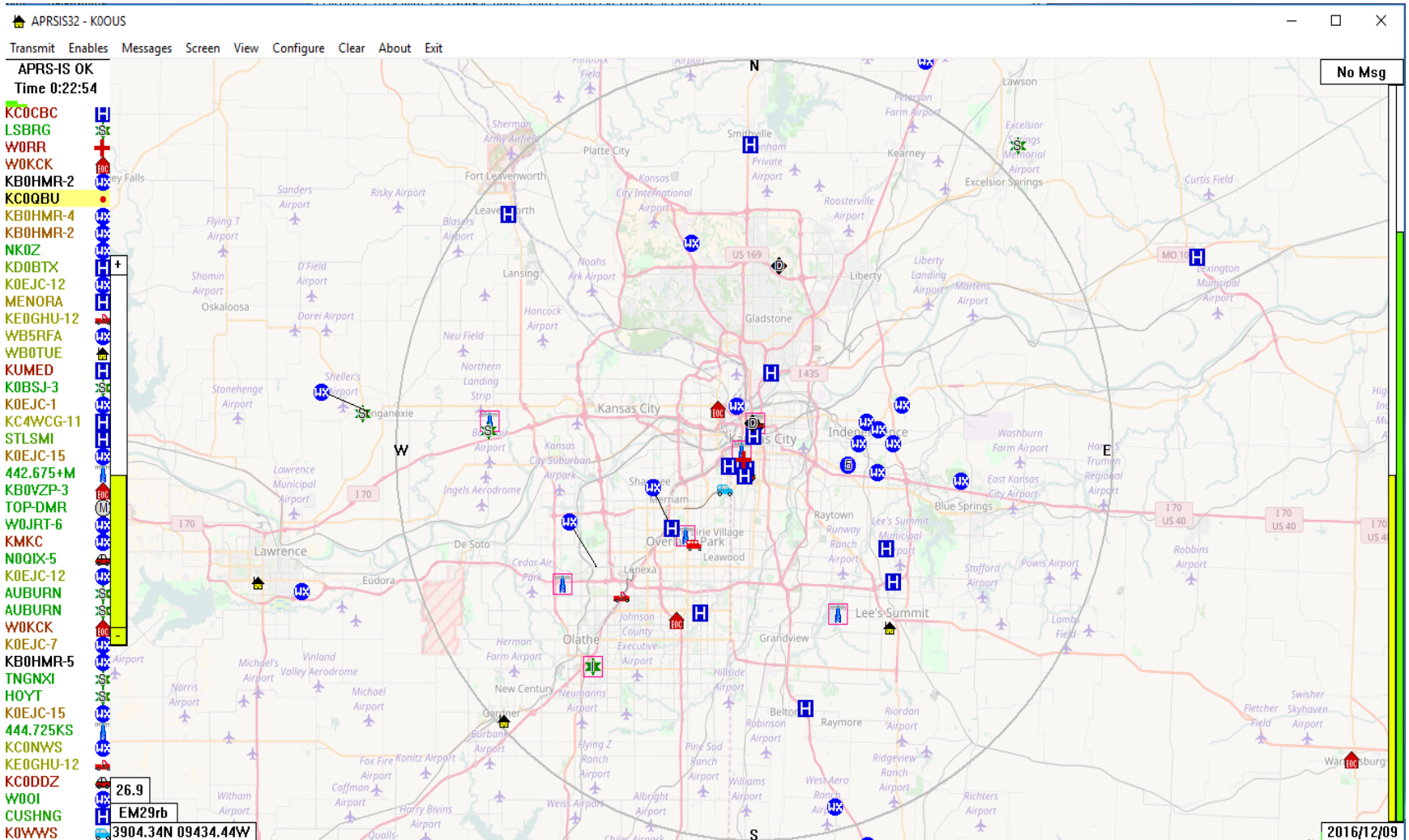


# APRS - Voicealert

- CTCSS 100 – “private” simplex channel  
Find other hams and QSY to talk
- CTCSS xxx – “personal” simplex channel
- Packet processed by TNC before tone  
Still shows up before tone squelch

<http://www.aprs.org/VoiceAlert3.html>

# APRS



# APRS Free Software

- Download the AGW Packet Engine

[https://www.soundcardpacket.org/  
2agwget.aspx](https://www.soundcardpacket.org/2agwget.aspx)

- Download APRSIS32

<http://aprsisce.wikidot.com/download>

# APRS passcode

- You'll need a passcode based on your callsign  
<http://n5dux.com/ham/aprs-passcode/>

Can use with internet connection or radio

# APRS challenges

- Lack of digipeaters in areas of mountainous terrain

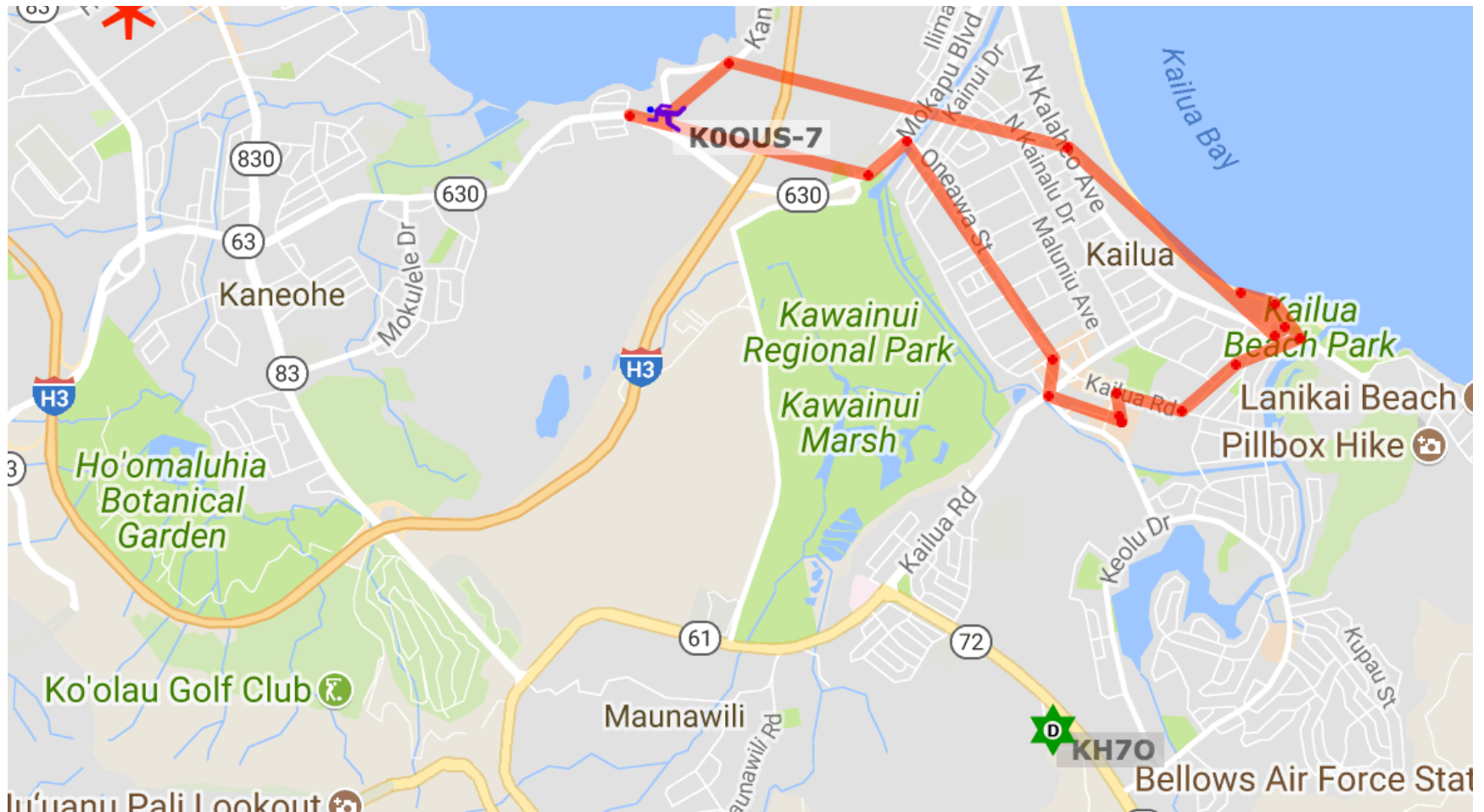
That's where NVIS and the 30m frequency might come in handy

# APRS global database map

- Aprs.fi
- Track by call sign
- Track by location

<https://aprs.fi/#!addr=96744>

# APRS – my local experience



# APRS – my wanderings

- KH7O digipeater is no longer on air  
Windward now has no digipeaters  
It also repeated Maui and Big Island traffic
- South shore appears to have just one!  
KH6MP mauka of Diamond Head



# More APRS and EMCOMM

- <http://www.n5fdl.com/davids-blog/2013/3/10/a-morning-of-aprs-emcomm-fun-in-tracy.html>
- [http://wb5rmg.somenet.net/2008/N8DEU\\_APRS-EmComm.html](http://wb5rmg.somenet.net/2008/N8DEU_APRS-EmComm.html)

# APRS on the Cheap

- RF

<http://forum.cert-emcomm.net/index.php?topic/569-aprs-using-phone-to-ht/>

- Smart Phones

APRSDroid, APRS-ios

- PC software mentioned above
- Recent article in QST

# Digital

- Thank you!